Patent Application

FIG. 1

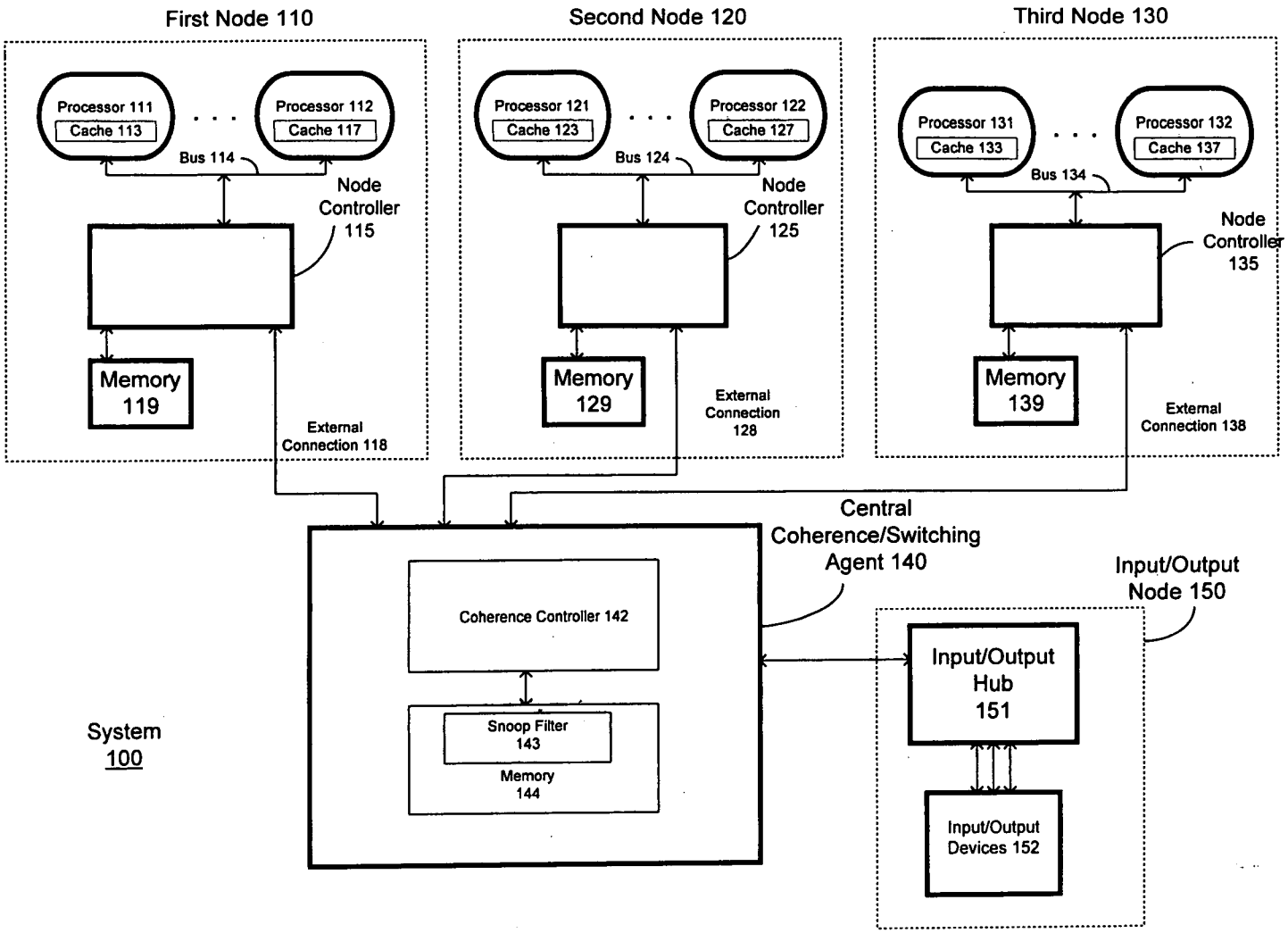


FIG. 2

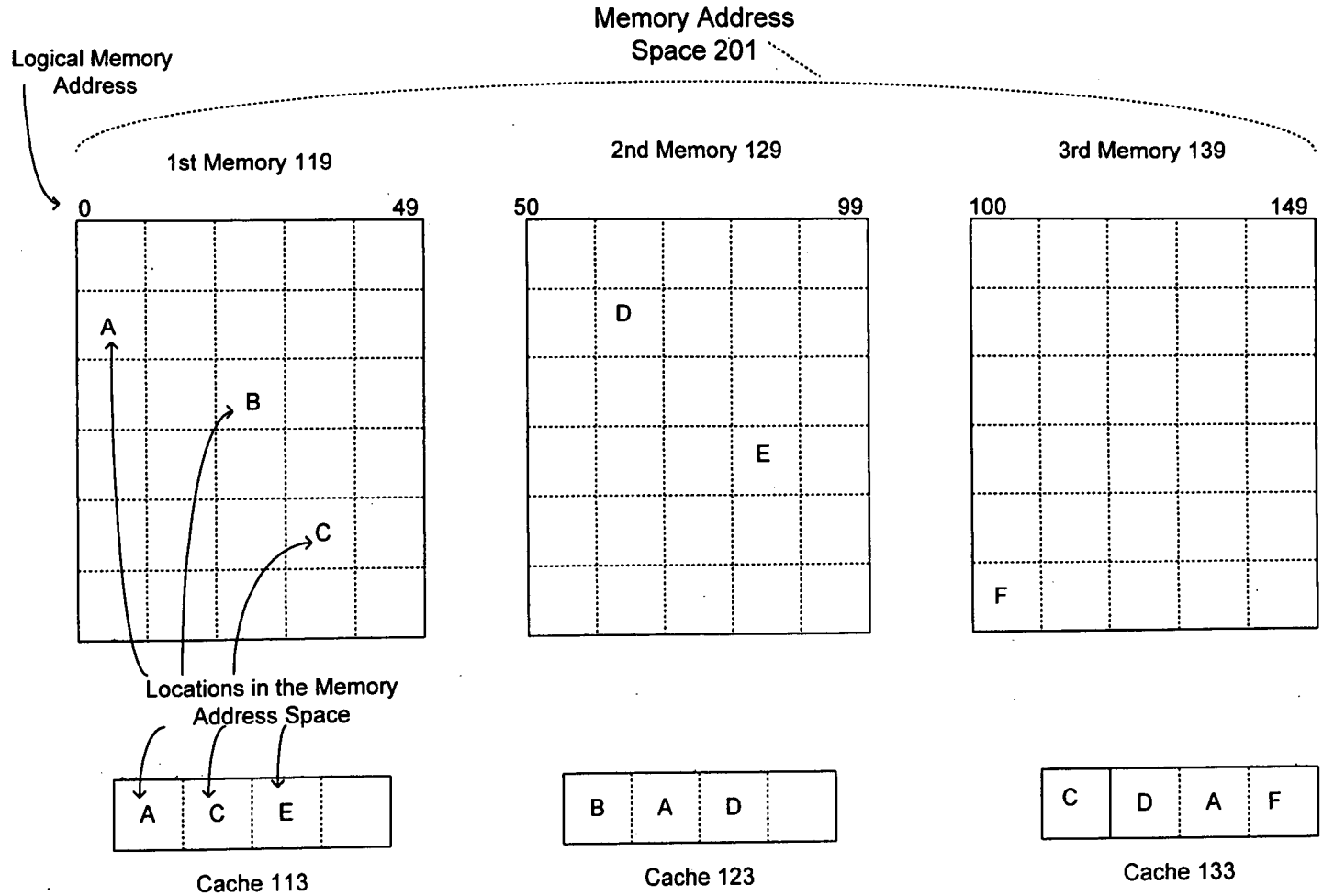

Memory Address Space 201
Logical Memory Address
1st Memory 119
2nd Memory 129
3rd Memory 139
0
49
50
99
100
149
A
B
C
D
E
F
Locations in the Memory Address Space
A
C
E
B
A
D
C
D
A
F
Cache 113
Cache 123
Cache 133

FIG. 3

Snoop Filter Table

143

301 Memory Address	303 Node/Processor Identifier	304 Caching Status
0	Node X, Processor Y	I, E, or S
10	Node X, Processor Y	I, E, or S
59	Node X, Processor Y	I, E, or S
•	•	•
•	•	•
•	•	•
N	Node X, Processor Y	I, E, or S

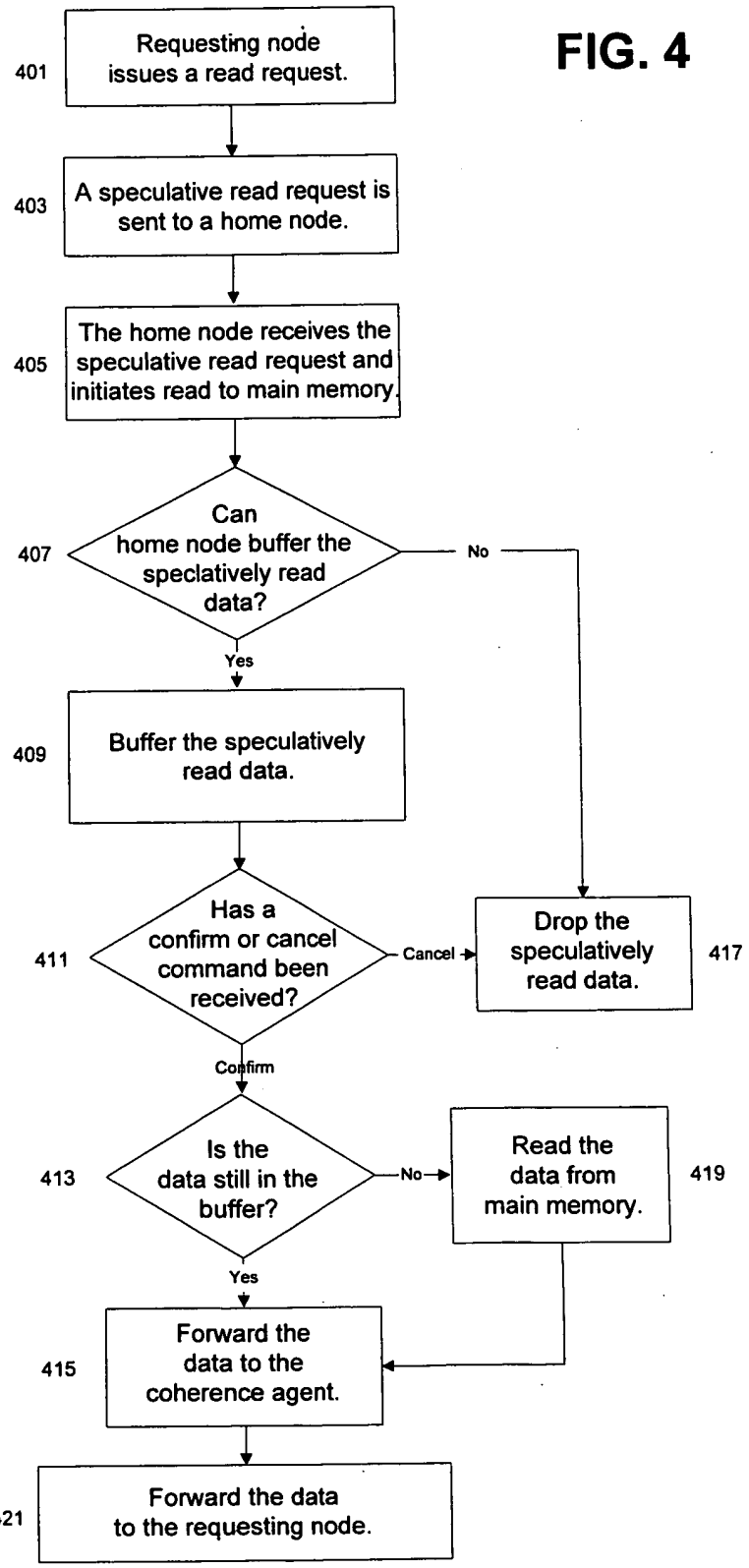
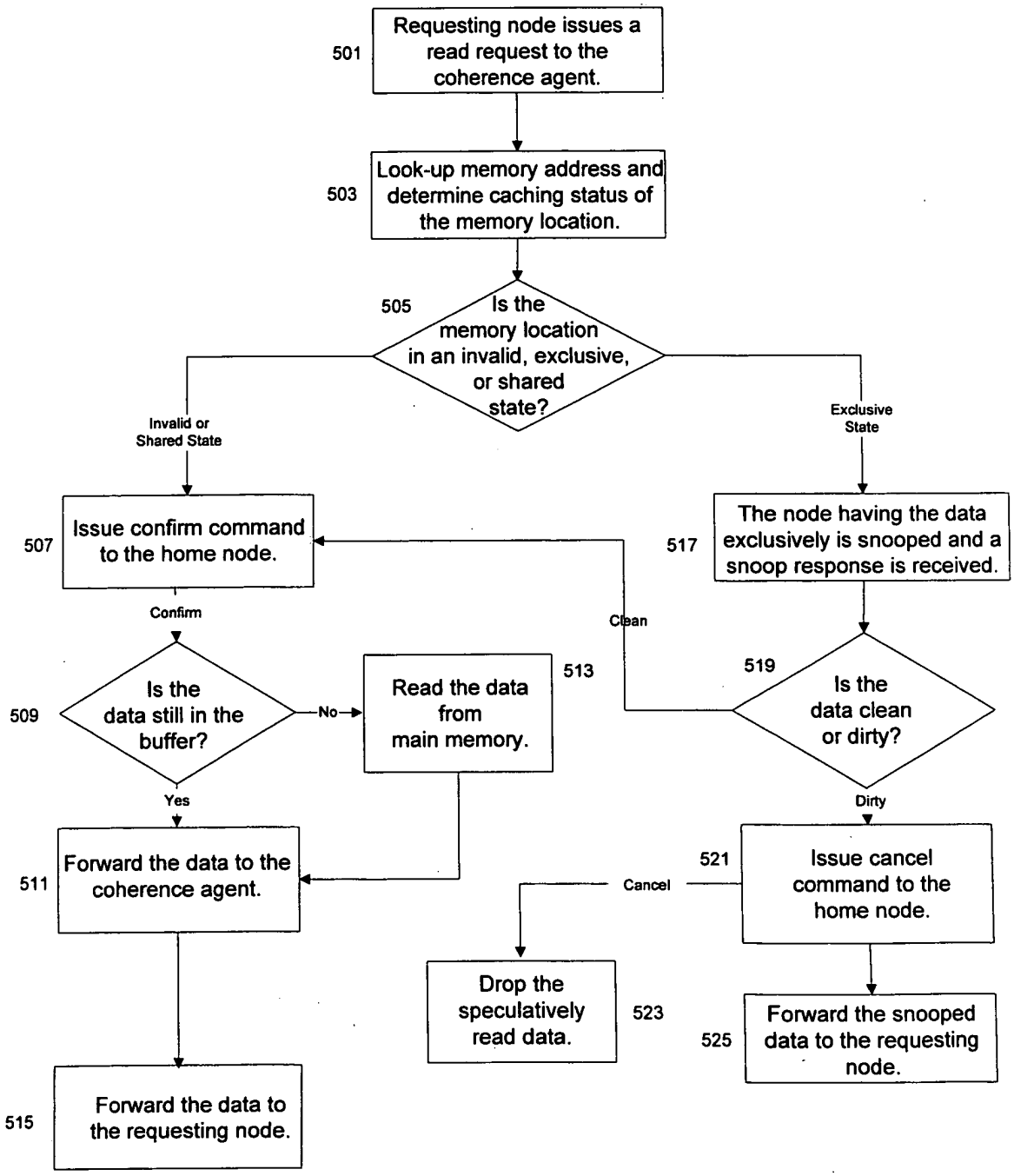

401
Requesting node issues a read request.
403
A speculative read request is sent to a home node.
405
The home node receives the speculative read request and initiates read to main memory.
407
Can home node buffer the speclatively read data?
No
Yes
409
Buffer the speculatively read data.
411
Has a confirm or cancel command been received?
Cancel
Drop the speculatively read data.
417
Confirm
413
Is the data still in the buffer?
No
Read the data from main memory.
419
Yes
415
Forward the data to the coherence agent.
421
Forward the data to the requesting node.

FIG. 4

FIG. 5


501
Requesting node issues a read request to the coherence agent.
503
Look-up memory address and determine caching status of the memory location.
505
Is the memory location in an invalid, exclusive, or shared state?
Invalid or Shared State
Exclusive State
507
Issue confirm command to the home node.
517
The node having the data exclusively is snooped and a snoop response is received.
Confirm
Clean
509
Is the data still in the buffer?
No
513
Read the data from main memory.
519
Is the data clean or dirty?
Yes
Dirty
511
Forward the data to the coherence agent.
521
Issue cancel command to the home node.
Cancel
Drop the speculatively read data.
523
525
Forward the snooped data to the requesting node.
515
Forward the data to the requesting node.